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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 09/998,288 | 11/30/2001 | Yaping Lu | M01A239 | 4840 |

7590 12/05/2003

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| EXAMINER |
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HUG, ERIC J

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| ART UNIT | PAPER NUMBER |
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1731

DATE MAILED: 12/05/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | | |
|------------------------------|------------------------|---------------------|--|
| Office Action Summary | Application No. | Applicant(s) | |
| | 09/998,288 | LU ET AL. | |
| | Examiner | Art Unit | |
| | Eric Hug | 1731 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 November 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-30 is/are pending in the application.
- 4a) Of the above claim(s) 1-16 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 17-30 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 November 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) ☐ All b) ☐ Some * c) ☐ None of:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
 * See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
 a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

Restriction to one of the following inventions is required under 35 U.S.C. 121:

- I. Claims 17-30, drawn to a method for cooling a hot drawn fiber, classified in class 65, subclass 434.
- II. Claims 1-16, drawn to a cap assembly, classified in class 65, subclass 510.

The inventions are distinct, each from the other because of the following reasons:

Inventions I and II are related as process and apparatus and for its practice. The inventions are distinct if it can be shown that either: (1) the process as claimed can be practiced by another materially different apparatus or by hand, or (2) the apparatus as claimed can be used to practice another and materially different process. (MPEP § 806.05(e)). In this case both apply. For example, the process as claimed may be performed in a heat exchanger unit having an integral cap assembly or a cap assembly structured in a different manner. The cap assembly as claimed may have gas exhausted by means other than pumping means, such as by way of a flow control valve.

Because these inventions are distinct for the reasons given above and the search required for Group I is not required for Group II, restriction for examination purposes as indicated is proper.

During a telephone conversation with Philip Von Neida on November 20, 2003 a provisional election was made with traverse to prosecute the invention of I, claims 17-30. Affirmation of this election must be made by applicant in replying to this Office action. Claims 1-16 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

1. Claims 17-19, 21, 23-25, and 28-30 are rejected under 35 U.S.C. 102(b) as being anticipated by Roba et al (WO 99/26891). Roba discloses an apparatus for cooling hot drawn optical fibers using a flow of cooling gas. A regeneration unit for the cooling gas is connected to the cooling apparatus. Figure 6 represents the cooling apparatus and regeneration unit. The cooling apparatus comprises a series of interconnected modules for through-passage and cooling

of the drawn fiber, and for transversing the flow of cooling gas in alternating directions. Each module is connected to a gas inlet, a gas flow regulator, and a mass flow regulator. Gas is collected from each module and sent through a valve (508a) to a regeneration unit comprising a purification apparatus (510). Two buffer units (502, 503) are positioned at the top and bottom ends of the cooling apparatus to isolate the cooling gas from ambient air. The buffer unit may be incorporated into the cooling apparatus. Each buffer unit comprises inlets and outlets for the passage of a buffer gas, which may be the same as the cooling gas (helium) or other gas (e.g., nitrogen). The cooling gas may be contaminated with the buffer gas, requiring purification before being recycled. The regeneration unit comprises valves, one or more purification units for removing air and buffer gas from the cooling gas, a pump for withdrawing the contaminated cooling gas, and a recycle loop for returning purified cooling gas to the cooling apparatus. See also page 14, line 6 to page 17, line 32 for detailed description of Figure 6.

With respect to the method of claim 17, Roba teaches performing steps a)-c) namely drawing a fiber within a heat exchanger (cooling apparatus) having a gas pumping means, at least one cap assembly (two buffer units), and inlets and outlets to the cap assemblies, introducing gaseous coolant to the heat exchanger, and removing a gaseous exhaust stream containing cooling and a gaseous impurity (buffer gas and ambient air) by means of the pump to a regeneration unit. With respect to the other claims:

Claim 18: The method of Roba is particular for a drawn optical glass fiber.

Claims 19, 21: The coolant gas of Roba may be helium. It is apparent that the coolant gas can be comprised of a single gas (reads on greater than 60%).

Claim 23: Cooling gas exhaust is withdrawn from the cooling unit at a constant rate corresponding to the flow rate at the inlet. A constant pressure of about 0.9 bars is applied (see page 18, line 26).

Claim 24: The fiber is drawn through the cooling apparatus of Roba, and the cooling gas is introduced to each module of the cooling apparatus at a unitary flow rate (see example on page 18).

Claim 25: The regeneration unit accomplishes the task of removing gaseous impurities and recycling the depleted cooling gas to the cooling apparatus as cooling gas.

Claims 28-30: The buffer units of Roba (equivalent to claimed cap assemblies) are present on the top and bottom of the cooling apparatus.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 17-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Darcangelo et al (EP 0 079 186) in view of Ji et al (US 6,125,638).

Darcangelo discloses an apparatus for drawing an optical fiber comprising a cooling device (Figures 2, 3). A hot drawn fiber is passed through a cylindrical coolant tube (30) provided with end caps (32, 34) for supplying and withdrawing helium cooling gas to and from the cooling tube at a controlled flow rate. The top end cap is particularly useful for the removal

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of helium if the helium is to be recovered (page 4, lines 32-34). With respect to claim 17, the cooling apparatus of Darcangelo accomplishes the claimed method steps of drawing a fiber through a heat exchanger having a cap assembly, introducing cooling gas to the heat exchanger via a gas inlet, and withdrawing gas from the heat exchanger from a top end cap. However, Darcangelo does not expressly disclose how the helium is removed and recovered from the top end cap, thus does not teach withdrawing gas and a gaseous impurity from the cap assembly by a gas pumping means.

Ji discloses a method of cooling a hot drawn optical fiber comprising withdrawing helium cooling gas and a gaseous impurity from a heat exchanger by means of a variable speed blower (pump). This exhaust gas is purified and recycled back to the heat exchanger as coolant gas. The rate of withdrawal is controlled primarily by the rate of flow of helium to the heat exchanger.

Ji states that withdrawn gas typically contains a gaseous impurity (air) which enters the heat exchanger through the fiber orifices. Ji also teaches that air usually infiltrates a fiber cooling system and that in systems establishing positive pressure in the heat exchanger suffer the disadvantage of losing cooling gas through the fiber openings in the heat exchanger. This would apply to cooling device of Darcangelo, which has a positive pressure within created by the flow of coolant gas, and which also has fiber orifices that allow air to contaminate the helium gas within and also allow helium to be lost through the orifices. Therefore, at the time of the invention, it would have been obvious to one skilled in the art to use the helium purification system of Ji with the apparatus of Darcangelo for the purpose of recovering and recycling expensive helium cooling gas from the upper end cap with minimal loss of the helium to the atmosphere.

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With respect to the dependent claims:

Claim 18: Darcangelo and Ji are particular for a drawn optical glass fiber.

Claims 19, 21: The coolant gas may be helium. It is apparent that the coolant gas can be comprised of a single gas (reads on greater than 60%).

Claims 20, 22-27: Each and every limitation herein is disclosed and claimed by Ji.

Claims 28-30: Darcangelo has caps on the top and bottom of the cooling apparatus.

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Roba (US 4,659,354) discloses a fiber drawing furnace comprising an integral cooling section and gas-filled sealing chambers at both ends of the cooling section to seal the cooling section from the drawing furnace at one end and from the surrounding atmosphere at the other end.

Schulte (US 5,377,491) discloses a coolant recovery system in a fiber optic heat exchanger whereby the heat exchanger has expanded cross-sectional areas at both ends for recovery of contaminated coolant gas. Schulte also discloses a purification system in conjunction with the heat exchanger.

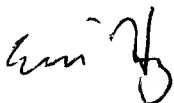
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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Eric Hug whose telephone number is 703 308-1980. The examiner can normally be reached on Monday through Friday, 9:00 AM to 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steven Griffin can be reached on 703 308-1164. The fax phone number for the organization where this application or proceeding is assigned is 703 872-9310.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703 308-0651.


jeh


STEVEN P. GRIFFIN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700